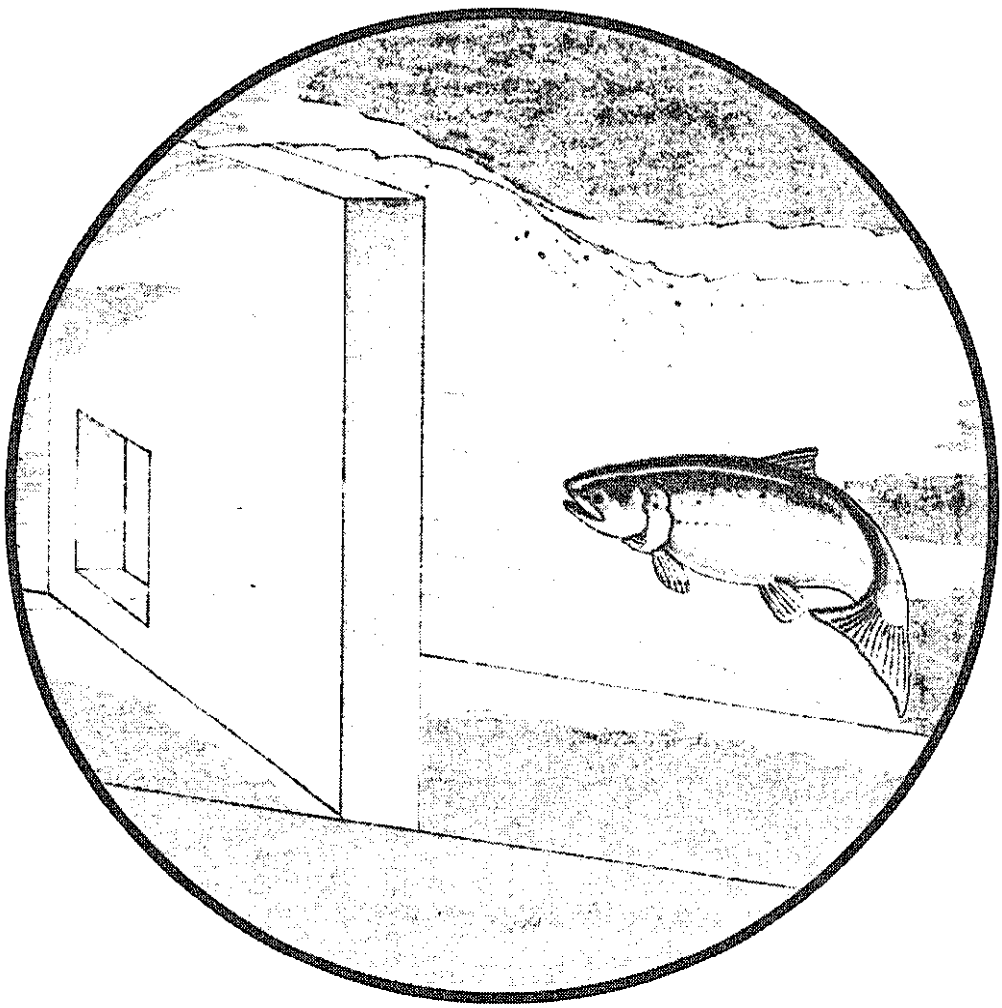
NOVEMBER 1996

INVESTIGATION OF HEAD BURNS IN ADULT SALMONIDS

Phase 1: Examination of Fish at Lookingglass Hatchery in 1996

Addendum to Final Report



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BONNEVILLE POWER ADMINISTRATION

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INVESTIGATION OF HEAD BURNS IN ADULT SALMONIDS

PHASE 1: EXAMINATION OF FISH AT LOOKINGGLASS HATCHERY IN 1996

ADDENDUM TO FINAL REPORT

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SECTION 1

BACKGROUND

This information is an addendum to the report "Investigation of Head Burns in Adult Salmonids, Phase 1: Examination of Fish at Lower Granite Dam, July 2, 1996" by Ralph Elston because there may be relevant observations included here. The author of this document participated in the examinations at Lower Granite Dam described in that report.

Because of Endangered Species Act issues, the Rapid River stock of spring chinook salmon reared at Lookingglass Hatchery on the Grande Ronde River in northeastern Oregon are annually being captured as returning adults at Lower Granite Dam on the Snake River and trucked to Lookingglass. During the peak migration period they are held in an adult holding facility at Lower Granite for as long as 72 hours and then transported by truck to Lookingglass for holding in an adult pond for spawning. In 1996 a total of 572 adults were transported from Lower Granite Dam between May 3 and August 6. Two-hundred eighty-one of these were later transported from Lookingglass to Wallowa Hatchery for artificial spawning and the remaining 291 were held for spawning at Lookingglass. On May 21, 24, 30 and June 2, 1996 hatchery personnel identified a total of 32 off-loaded fish with lesions on the dorsal area of the head they described as having the appearance of blisters (Robert Lund personal communication). By date these are shown in Table 1 (fish with similar lesions were also observed on May 27 but the number of these was not recorded). Such lesions were not observed on fish off-loaded on any other dates. On May 24, 1996 hatchery personnel took photographs of fish with these lesions but do to light-meter problems the photographs did not turn out.

Table 1. Proportion and prevalence (%) of Rapid River spring chinook adult salmon transported from Lower Granite Dam to Lookingglass Hatchery between May 21 and June 2, 1996 with lesions on the dorsal area of the head. These lesions were described as blister-like by hatchery personnel. Fifty-one fish were also transported on May 27, 1996 and some had similar lesions but the number of fish with these was not recorded.

Date transported in 1996	Fish with Head Lesions	
	Proportion	Prevalence (%)
May 21	1/17	5.9
May 24	8/39	20.5
May 30	10/50	20.0
June 2	13/90	14.4

On June 28, 1996 personnel of the Oregon Department of Fish and Wildlife (ODFW) Fish Pathology laboratory in La Grande were notified by James Lauman, ODFW Northeast Region supervisor, of discussions and concerns of head burn on returning adult chinook while he was on a visitation to Lower Granite Dam. That led to subsequent investigations at Lower Granite Dam (Ralph Elston 1996) and Lookingglass Hatchery. The results of the Lookingglass investigations are reported here.

SECTION 2

RESULTS AND DISCUSSION

Efforts were made during spawning operations and during examinations of mortalities to identify fish with any signs on or about the head that might indicate head burns or some type of blister-like lesion. Most of the mortalities were necropsied following a freeze-thaw cycle and fungal lesions become difficult to identify. Secondary fungal lesions as seen in Figure 1 could be one outcome from head burns or blisters on the head. This photograph of a live Rapid River adult at Lookingglass on August 15, 1996 shows a severe fugal lesion that is symmetrical dorsally and dorsal-laterally on the head with a second large lesion just posterior to that on the dorsal side. Three frozen-thawed mortalities examined on July 3, 1996 had fungal or muscle lesions that displayed a somewhat similar pattern. Figures 2 and 3 are photographs of an lmnaha spring chinook adult mortality, also on August 15, 1996. The lmnaha adults are trucked from the lmnaha River for holding and spawning at Lookingglass and return to the lmnaha River through the same lower Snake River corridor as the Rapid River stock. There was complete loss of epidermal and dermal tissues exposing the underlying tissues. This lesion was also symmetrical about the head in almost the same area as the fish in Figure 1. Also note the two blister-like lesions along the back posterior to the larger lesion. No such fungal or muscle lesions were observed on any spawned fish of either Rapid River and lmnaha stock. The pattern of the lesions on the fish in Figures l-3 appears to be similar to the pattern of healed tissue in Figure 5 from Elston's report (Elston 1996).

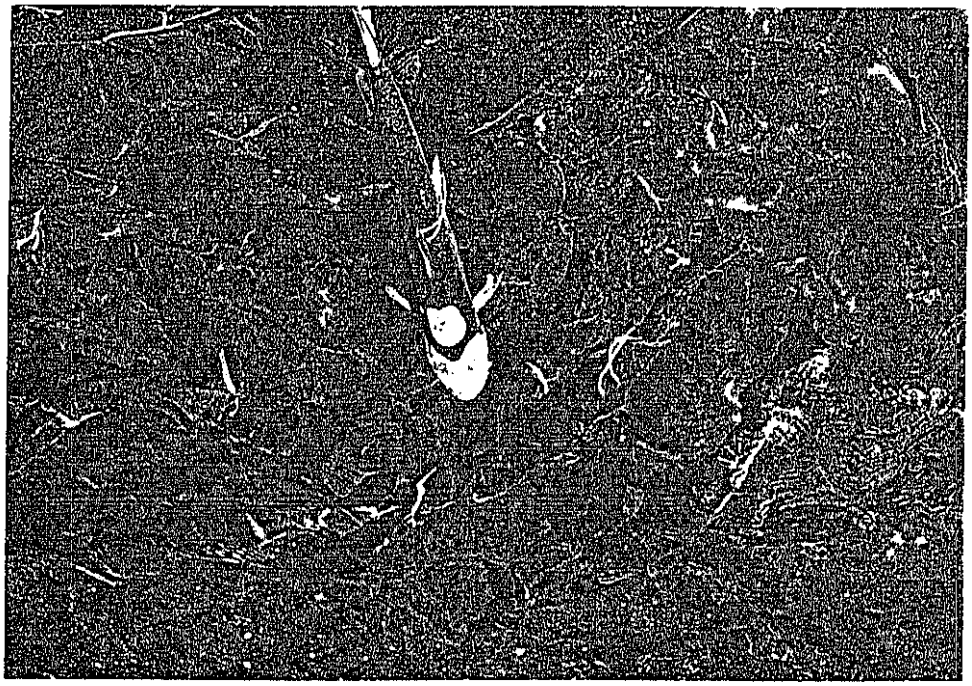
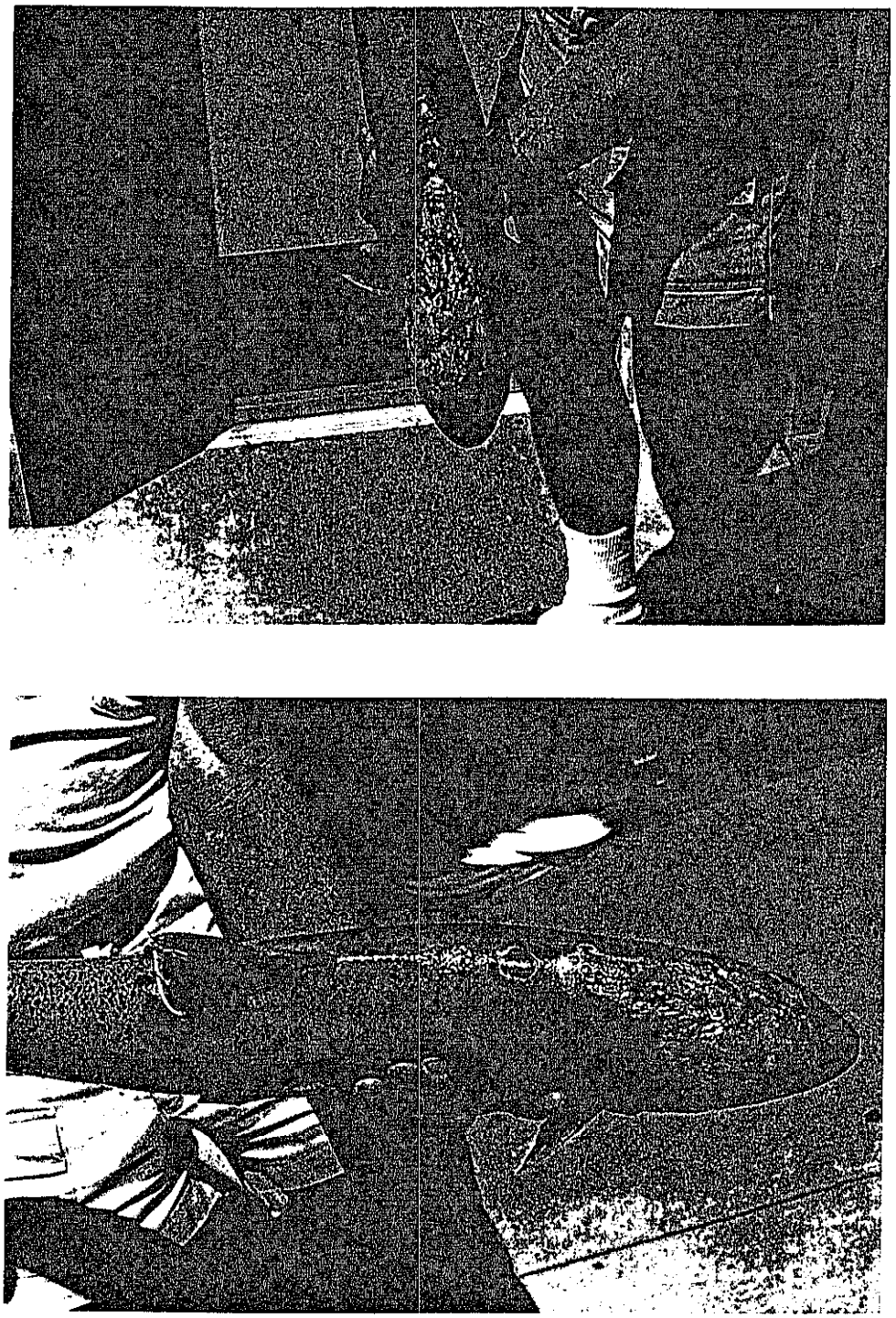


Figure 1. Fungal lesions on the head and anterior back of a Rapid River stock live adult chinook salmon in the adult holding pond at Lookingglass Hatchery on August 15, 1996. The head lesion was noted to be symmetrical on the dorsal and dorsal-lateral areas of the head.



Figures 2 and 3. Lesions on the head and anterior back of an lmnaha stock adult chinook salmon fresh mortality removed the adult holding pond at Lookingglass Hatchery on August 15, 1996. There was complete loss of epidermal and dermal tissue from the head lesion which was symmetrical on the dorsal and dorsal-lateral areas of the head. Two blister-like lesions on the back are also present just posterior to the head lesion.

There was not an unusually high prevalence of fungus on adults at Lookingglass in 1996 but there *was* higher than normal mortality in pre-spawning adults. Data from necropsies determined this to be primarily due to *Renibacterium salmoninarum* (bacterial kidney disease) and *Aeromonas salmonicida* (furunculosis), neither of which are known to cause the type of lesions documented here. Whether or not head burn exacerbated these conditions is unknown. The symmetrical nature of the lesions on almost identical areas of the head and just posterior to the head observed on the fish in the two photographs does not suggest mechanical or physical trauma. Nor have such lesions been obvious in past years at Lookingglass. Observations by the hatchery crew of blister-like head lesions on some trucked fish suggests a possible correlation to head burn reports at Snake River dams and certainly merits further investigation as to occurrence, etiology, pathogenesis and potential impacts on Snake River salmonid populations. Both ODFW hatchery and fish pathology personnel will attempt to further document head burn or other unusual lesions on Rapid River adults transported to Lookingglass in 1997 and lmnaha adults collected at the lmnaha trap. This will include tissue samples for histopathology from affected areas,

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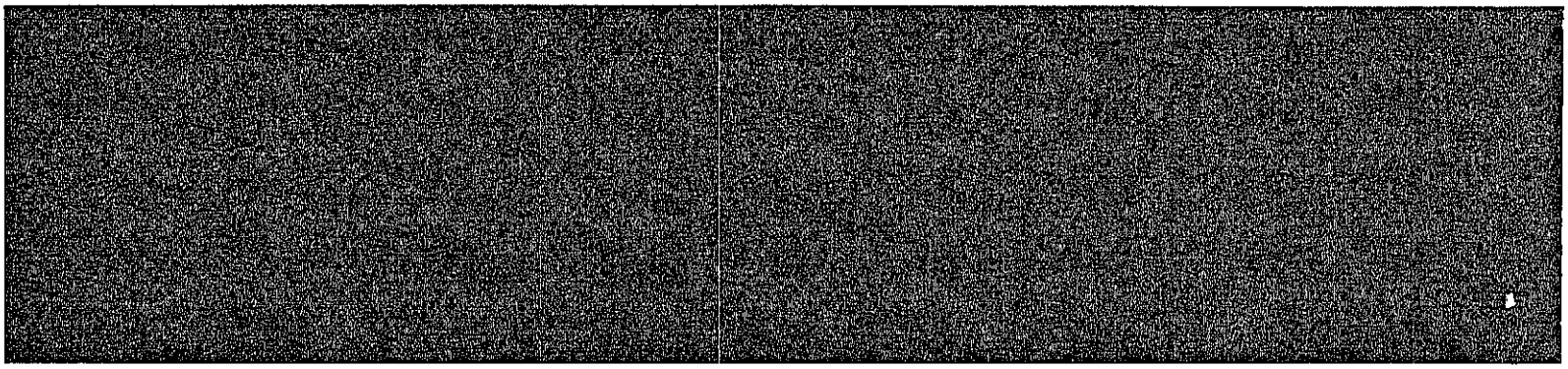
ACKNOWLEDGMENTS

Robert Lund, Ken Danison and the crew at Lookingglass Hatchery provided critical data and observations for this report. Funding for the investigations reported here was from the Lower Snake River Compensation Program.

SECTION 4

REFERENCES

Elston, Ralph. 1996. Investigation of head burns in adult salmonids, Phase 1: Examination of fish at Lower Granite Dam, July 2, 1996. Final Report, Prepared for Bonneville Power Administration, Portland; Oregon, Project Number 96-050-00, Contract Number 96AP95973, August 1996.



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